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DOI: https://doi.org/10.1177/0886260502017001002

Journal of Interpersonal Violence, Vol. 17(1), Jan 2002, 14-32

doi: http://dx.doi.org/10.1177/0886260502017001002

The Role of Weapons in Violent Acts:
Some Results of a Swiss National Cohort Study

by

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Abstract

The role of guns and other weapons in violent acts has often been a subject of debate. The present study is based on a sample of 21,314 valid interviews with 20 year old Swiss men, representing over 70 percent of this cohort. The results show a much higher frequency of violence among owners of handguns and other weapons, but not of rifles. Gun owners also have been injured more often, and they suffer more often from psychiatric symptoms. A considerable proportion of violent gun owners had previous police contacts and court appearances, suggesting that policies designed to confiscate guns would be feasible. In a multivariate model, which considered a great number of conventional criminological variables (such as delinquent friends) and indicators of psychopathology, ownership of handguns and other weapons (but not rifles) turned out to be a very important factor in explaining violence leading to bodily injury.

Introduction

There is substantial evidence in criminology that crime is the result of social, personality, and situational factors. This has been shown not only for rational or utilitarian offences, such as theft, crimes providing immediate material advantages, and destructive acts such as suicide (Clarke & Lester 1989). The availability of means to commit suicide and homicide is, for example, strongly correlated with the frequency of such events (Killias, van Kesteren, Rindlisbacher, 2001). Because there is no good reason to

[1] Author's Note: This research has been supported by grant 4040-045180 of the Swiss National Science Foundation. The authors wish to thank Martin Rindlisbacher, School of Forensic Science and Criminology, University Of Lausanne, for valuable help in connection with the literature search, and Kathy Payne, Institute of Criminology at the University of Cambridge, and Ghazala Sattar of the Home Office in England and Wales for their editing help.

believe that a high prevalence of suicide increases the motivation of people to buy and keep guns in their homes, there is good reason to assume that the presence of weapons increases the likelihood of violent acts.

The results of American research on gun ownership among adolescents (as reviewed for example by Page-Randy & Hammermeister 1997) consistently point to a possible causal relationship between access to guns and violence. Similar findings have been reported in Europe. In a national sample of 970 Swiss juveniles aged 14 to 21 who were interviewed in 1992 as part of the international self-report project (Junger-Tas, Terlow & Klein 1994), violent juveniles were found to own or carry weapons much more often than their non-violent peers (Killias & Rabasa 1997). According to the results of the Cambridge Study in Delinquent Development, violent offenders tend to use weapons more often (Farrington 1995). Although cross-sectional studies (such as the Swiss survey of 1992) do not, strictly speaking, allow the identification of causes and consequences, it is reasonable to assume, as suggested by psychological evidence, that violent juveniles are more interested than others in acquiring arms in view of future violent confrontations.

However, a more serious problem in research on the role of weapons in violent acts is that most samples are far too small to identify serious violent events in general and of gun use in particular in numbers that would allow meaningful statistical analyses. After a review of the Criminal Justice Abstracts (1982-1999) and the Criminology & Penology Abstracts (1969-1997), we were unable to find any reference to studies using samples of 10,000 respondents or more.

Such data would be required, however, to assess the extent to which possession of arms is related to offending, and to what extent individuals who own arms have violent and/or antisocial personalities. Information like this might be helpful in designing policies aimed at improving controls over candidates for any permits related to guns. In addition, research on situational factors may more easily translate into appropriate policies aimed at reducing the occurrence of violent acts, than studies focused on social or personality variables.

A national cohort study on violence

Every year, Swiss Army recruits are interviewed on a topic of social or policy relevance. In 1997, the topic chosen was violence, either committed or experienced, in a biographic perspective. After approximately 4 weeks of basic training, the soldiers were asked to fill out a questionnaire containing about 900 variables on biographic and social circumstances of their childhood and adolescence, including violent and other deviant behaviour they had either committed or experienced (as victims). The questionnaire included many items concerning mental health and deviant behaviors along with situational circumstances such as the possession of weapons. Usually about 40 to 60 soldiers were sitting in a large room, with considerable space between them (as in an exam), under the (remote) supervision of civilian staff. The soldiers were guaranteed complete anonymity of their responses. In order to emphasise this, the soldiers were shown a kind of ballot box into which they were to drop their filled-out questionnaires. Hence, the confidentiality was comparable to that of a ballot, and only a few soldiers refused to co-operate. While all recruits were obliged to assist at the session, the questionnaire explicitly allowed respondents to leave any questions unanswered. As a result, on average about 5 percent of all questions remained unanswered and more than 94 percent answered both the delinquency and the victimisation questions.

With 21,347 completed and 21,314 valid interviews, the sample included over 70 percent of Swiss men aged 20 in 1997. This is due, of course, to the fact that military service is still compulsory in Switzerland, and that over 80 percent of 20 year old men are drafted (some of them are excluded from the army within the first 10 days of recruit training). Given the large size of the sample, relatively high (absolute) numbers of very serious criminal acts were admitted. The plausibility and presumptive validity of all extreme indications were assessed before the data was analysed. Generally speaking, the validity was high, and only 25 questionnaires had to be removed from the analysis. The interest in the research is confirmed by the 5,000 recruits who wished to learn about the results and sent the corresponding form to our institute.

Men of the same age group who did not serve in the Army in 1997 were invited to answer by mail a short version of the questionnaire. This sample showed a bimodal distribution, with a disproportionate number of university students. Illegal drug use and sexual harassment were admitted somewhat more often by the men

not enrolled in the Army, whereas physical violence and forced sexual intercourse were admitted more by Army recruits. However, the differences were not large (Haas, 2001). It has been found that 16.3% of all recruits admitted having carried weapons, compared to only 9% of the non-recruits (sig. $p<0.001$). However, it is likely that persons in institutions or in marginal living circumstances were not reached, either by mail or via the Army.

Results

First, we consider bivariate relationships between ownership of guns, knives, and other types of weapons, and various forms of violence, victimization, and indicators of psychiatric symptoms. Second, we try to assess, through a multivariate analysis, the relative weight of guns and other weapons in comparison with other potentially important factors. Given the large size of the sample and unless otherwise stated, all differences given in the following tables are significant at $p<.01$ at least.

The prevalence of the possession of weapons

Table 1 gives details of the ownership of all types of weapons included in the questionnaire.

Table 1: Prevalence (%) of Privately Owned Weapons Kept at Home During the 12 Months Before Entering Military Training (N=21,314)

Type of Weapons Owned	Numbers of Weapons Owned				
	none	1 or 2	3 or more	unknown	total of each row
Wooden arms, baseballs bats, nunchakus etc.	67.2	15.5	11.9	15.4	100.0
Knives (longer than a Swiss knife)	53.7	27.6	8.7	10.1	100.0
Iron bars, chains, knuckle dusters	74.4	5.0	1.3	19.3	100.0
Handguns	73.9	7.0	2.0	17.1	100.0
Rifles	68.3	16.1	3.7	11.9	100.0
Any of the above	47.8	33.2	16.1	2.9	100.0

The questionnaire did not include a question on whether a weapon was legally or illegally owned. Under Swiss law, this distinction would not make much sense, because possession of most types of weapons is not generally prohibited (although carrying them is restricted). Therefore, a few respondents may have

indicated military equipment (which Swiss militia soldiers store at home) rather than strictly privately owned weapons. On the other hand, handguns (pistols) are given only to officers and senior non-commissioned officers, and a few specialists. In other words, virtually no one among the 9% handgun owners can have received it as part of his military equipment.

As far as guns are concerned, the rates match the results of the 1998 (and earlier) national crime surveys in Switzerland. According to unpublished rates (Clerici & Killias 2000), 20% of households own one or more rifles (same as among the recruits), and 6% own at least one handgun (9% among the recruits). Five percent of households own one or several rifles as well as one or several handguns (6% among the recruits). Hence, the rates of the recruits are not out of line with what one finds in the general population, although handguns seem to be somewhat more popular among the soldiers than among the older segments of the population.

The nonresponse category is particularly interesting in this case because the number of those who failed to answer this question seems to be correlated with the illegal or otherwise problematic status of certain types of weapons. Nonresponse is moderate for knives and rifles (10% and 12%, respectively) which can easily be obtained legally. On the other hand, it is highest for baseball bats, handguns, iron bars, chains, and knuckle dusters, which are weapons which are either controlled or generally forbidden (such as the several types of iron devices). Hence, the frequency of nonresponse may reflect a somewhat criminal nature of certain weapons. We shall, therefore, attach particular attention to this category in analyses.

"Collectors" are another group that will need special attention. Collectors are those who simultaneously own three weapons or more.

Possession of weapons and self-reported violence

Twenty-four percent of all recruits admitted carrying out a violent act of any type during the 12 months before the start of the military training. Most of this violence involved physical fights among men not resulting in bodily injury and/or committed without weapons. Of all recruits, only 1.4 percent (N=307) admitted having committed violent acts with weapons. Table 2 gives the prevalence rates of self-reported

acts of aggression with the use of weapons, committed during the 12 months before the start of the military training. These rates include acts without injury.

Table 2: ***Prevalence (%) of Self-Reported Violent Acts, Committed with Any Weapon During the 12 Months Before Entering Military Training (N=21,314)***

Type of Weapon Owned	Number of Weapons Owned			
	none	1 or 2	3 or more	unknown
Baseball bats, nunchakus etc.	0.4	4.3	15.4	1.6
Knives (longer than a Swiss knife)	0.3	1.8	7.2	1.6
Iron bars, chains, knuckle dusters	0.5	10.8	23.2	1.3
Handguns	0.6	7.2	14.4	1.4
Rifles	0.7	2.7	6.8	2.0
Any of the above	0.2	0.6	6.7	1.1

Among those soldiers who did not own any of the types of weapons listed, only 0.2 percent had attacked another person with a weapon. The rate is higher for owners of all types of weapons, but particularly for "collectors" (i.e. those owning three or more weapons of any kind) and for those who own iron chains and other weapons which, by their nature, may be more often used in criminal contexts. On the other hand, owners of rifles have relatively low prevalence rates, perhaps because such weapons are more often used for hunting or target shooting, (i.e. two leisure-time activities more associated with conformist attitudes and lifestyles). Similar differences between recreational and protective gun ownership have been found in the Rochester Youth Development Study (Lizotte, Tesoriero, Thornberry & Krohn, 1994). Another possibility is that some recruits who do not own private weapons, mistakenly indicated their army rifle under this category. Finally, nonresponse seems to be associated with a slightly higher prevalence of self-reported violent attacks, probably because some violent respondents failed to admit owning illegal weapons.

When violent acts causing actual injury (needing medical attention) are considered, the role of ownership of weapons seems to be even more important, suggesting that weapons not only increase the occurrence of violent events, but also the seriousness of outcomes (Table 3). Such effects of guns have often been reported in American research (Cook, 1991; Kellerman et al., 1992; Zimring & Hawkins, 1987), but may

be true for other types of weapons as well. In the present study, however, it is not known how the injuries were actually inflicted, and quite a few may have been committed without any weapon. In total, 669 recruits (3.1%) admitted having injured somebody to the point of needing medical attention or hospitalization during the past year.

Table 3: ***Prevalence (%) of Self-Reported Injury-Causing Violent Acts During the 12 Months Before Entering Military Training (N=21,314)***

Type of Weapon Owned	Number of Weapons Owned			
	None	1 or 2	3 or more	Unknown
Baseball bats, nunchakus etc.	1.6	7.9	16.9	3.3
Knives (longer than a Swiss knife)	1.5	4.6	8.9	2.8
Iron bars, chains, knuckle dusters	2.0	13.9	19.6	3.5
Handguns	2.2	9.6	14.7	3.5
Rifles	2.4	4.4	7.4	4.6
Any of the above	1.3	3.0	9.1	1.5

Again, the rates are highest for collectors and for owners of weapons such as iron bars and chains (i.e., weapons without any feasible legitimate use). The base rates (for nonowners of weapons) are somewhat higher than those shown in Table 2 because acts committed without any weapon are included. Again, nonresponse (concerning weapon ownership) does seem to be associated with higher prevalence rates of self-reported acts having caused injuries.

The differences are the most dramatic if one considers self-reported acts in which firearms were used (Table 4).

Table 4: Prevalence (%) of Several Forms of Self-Reported Violent Acts and Gun Use During the 12 Months Before Entering Military Training (N=21,314)

Type of Self-Reported Violent Act	*Does Not Own Any Firearm (n=14,298)*	*Owns 1 or More Rifles (No Handguns) (n=2,929)*	*Owns 1 or More Handguns (n=1,920)*	*Unknown (n=2,167)*
Caused an injury (no matter how)	2.1	3.0	10.7	3.7
Threatened someone with a weapon	0.9	2.8	12.0	2.7
Shot on purpose at someone	0.0	0.3	4.4	0.4
Shot on purpose at someone and caused any injury (no matter how)	0.0	0.1	2.6	0.1

As Table 4 illustrates, use of firearms virtually does not exist among those who do not own private firearms, although some of these respondents may have had access to someone else's gun (for example, another household member). From a situational theory viewpoint, this may seem plausible, but it is worth noting since opponents of gun-control measures consistently claim that criminals will always find weapons. Obviously, and even in a country with many weapons in circulatio, such as Switzerland, this may not be correct. On the other hand, those who own one or several handguns have used a weapon at an astonishing frequency: 4.4 percent admit having fired at someone during the 12 months period, and 2.6 percent admitted having fired *and* injured another person (although not necessarily with a gun). We suspect that in most cases in which these respondents shot at someone, the victim was not injured, and that those who injured someone did so without a weapon. This would explain why these respondents are able to serve in the army because injuries resulting from gunshots are unlikely to remain undetected, and known serious offenders tend to be disqualified from service.

Interestingly, those who own one or several rifles are far less violent than the holders of handguns. Again and as observed by Lizotte et al. (1994) in the Rochester Youth sample of 14-15 year old recreational gun owners, owners of rifles seem to resemble nonowners more than young men with handguns (who resemble more the "protection" gun owners in the Rochester study). About the same (relatively low) level of violence is found among those who did not answer the items concerning gun ownership. Because

possession of guns is not prohibited, there is not much inhibition in admitting to owning guns among young Swiss men, and those who failed to do so may not have necessarily biased the results.

Self-reported contacts with the criminal justice system

Owners of weapons of any kind report contacts with the criminal justice system more often than those who do not own a weapon. The differences become particularly interesting when only respondents with at least three weapons are considered (i.e., collectors). In Table 5, contacts for all kinds of offences are included.

Table 5: ***Lifetime Prevalence (%) of Self-Reported Police Contacts and Court Appearances Among Collectors Compared to Nonowners of Weapons (N=21,314)***

	Police Contact		Police *and* Court Appearance	
Type of Weapon	Nonowners	Collectors	Nonowners	Collectors
Baseball bats, nonchakus etc.	22.7	44.4	5.8	20.1
Knives (longer than a Swiss knife)	21.8	36.6	5.2	15.7
Iron bars, chains, knuckle duster	23.7	42.8	6.4	26.5
Handguns	24.0	37.4	6.6	16.6
Rifles	24.1	31.5	6.7	13.4
Any kind of weapon	21.3	36.8	5.0	15.2

The differences are much larger for court appearances than for police contacts, suggesting that nonowners of weapons may occasionally also commit offences, but probably less serious ones that consequently, are less frequently prosecuted in court.

When only seriously violent gun owners (i.e., respondents who, during the 12 months, have injured (no matter how) and have also shot at a person are considered, the differences are even more striking (see Table 6).

Table 6: Prevalence (%) of Self-Reported Police Contacts and Court Appearances Among Seriously Violent Gun Owners Who Shot at Somebody (n=51)

Offence Type / Time Period	*Police Contact*		*Police and Court appearance*	
	Violent Gun Owners and Users (n=51)	*Other Respondents (n=21,263)*	*Violent Gun Owners and Users (n=51*	*Other Respondents (n=21,263)*
Violent offenses, 12 months	43.1	1.0	25.5	0.3
Violent offenses, life-time	56.9	9.6	43.1	3.4
All offenses, 12 months	51.0	12.3	29.4	3.1
All offenses, life-time	76.5	26.1	54.9	7.8

The differences are obvious at the level of police contacts, but even more dramatic at the court level. Due probably to the seriously violent character of their offences, these respondents were transferred to the court far more often than the remaining respondents. This finding has major policy implications, insofar as it suggests that the criminal justice system is often aware of certain gun owners' violent propensities. Better record checks before any permits are issued, and confiscation of guns after certain individuals are identified as violent offenders might help to reduce risks from this group. Since this particularly dangerous group is not very large but presumably accounts for a large proportion of all serious offences committed by the entire sample, it would seem easy to obtain substantial benefits for public safety by targeting any measures at these few serious offenders.

Indeed, handgun owners represent 9% of the entire sample, but 31% of those who committed any injury, and 80% of those who have shot at another person over the last year. If incidence rather than prevalence (or person-level) rates were considered, the disproportionate involvement of a few handgun owners might be even more dramatic. Therefore, there is little doubt that a small group of irresponsible handgun owners account for a considerable proportion of all serious violent acts committed by the entire sample.

Possession of weapons and victimization

In the 1992 national sample of Swiss juveniles and in some American studies (Durant et al. 1995, Webster, Gainer & Champion 1993), possession of weapons was found to be correlated with violent victimisation. This also seems to be the case in the present sample.

Table 7: Percentage of Owners and Nonowners of Guns Injured in a criminal offence (N=21,314)

Victimization and its consequences	*Nonowners (n=14,298)*	*Gun Owners (n=4,849)*	*Unknown (n=2,167)*
Did not report any injury	94.6	88.9	92.5
Minor injury only (not needing medical attention)	4.3	8.1	5.9
Injury needing medical (outpatient) treatment	0.7	1.9	1.0
Injury needing hospital treatment	0.3	1.2	0.7
Total	100.0	100.0	100.0

Gun owners seem to get injured far more often than men who do not own private guns. In addition, the gap seems to grow with increasing seriousness of the injuries: indeed, gun owners were hospitalised as a consequence of a criminal offence about twice as often as nonowners, over 12 months.

Correlations such as these are obviously open to two contrary interpretations: Either gun owners take greater risks, and as a result are more often injured; or persons who are injured are more eager to own a private gun. Although cross-sectional studies such as the current study cannot provide definitive answers to questions of causal order, the following table may provide interesting insights into this complex relationship.

Table 8: Prevalence (%) of Gun Ownership, by Seriousness of Injury Suffered from a Criminal Offense (N=21,314)

Possession of guns	*No Injury Reported (n=19,840)*	*Minor Injury Only (n=1,140*	*Needed Medical (outpatient) Treatment (n=216)*	*Needed Hospital Treatment (n=118)*
Nonowners of guns	68.2	54.5	48.2	40.7
Gun owners	21.7	34.4	41.7	47.5
Unknown	10.1	11.1	10.2	11.9
Total	100.0	100.0	100.0	100.0

Although the proportion of gun owners increases with the increasing seriousness of injuries suffered from violent encounters, the differences are much smaller than in Table 7, and even more modest than those in Tables 3 and 4. The differences in the frequency of violent acts (attacks as well as bodily harm) between gun owners and other respondents are much more important than the relatively modest changes shown in Table 8. Therefore, gun ownership increases violent victimization and violent acts much more than such experiences increase gun ownership, although in some instances, the causal order may be reversed. This also gives little credit to the possibility that many of the situations in which gun owners use their guns may meet the criteria of legitimate defense (Dudley Duncan, 2000).

Psychiatric symptoms and gun ownership

Causal interpretations of correlations are not problematic when for logical reasons one of the two possible interpretations has to be ruled out (i.e., if one variable cannot influence the other). This may be true for a number of indicators of psychiatric symptoms which were measured by the questionnaire. When measuring self-reported psychiatric symptoms with an anonymous questionnaire, one is confronted with problems to measuring similar to those of measuring self-reported delinquency. Just as it is impossible to record the precise offenses, as defined by the different penal codes, it is not possible to record the symptoms in the same way as it is done in a clinical diagnosis. Instead, we could record indicators of symptoms which were then processed into composite variables serving as an operationalization of personality disorders. However, psychiatric epidemiology research has shown that this is indeed a valid method for gaining information on

mental health. We categorized symptom indicators such as low frustration tolerance, social isolation, diminished reality control (in financial matters), risky sexual behaviour, excessive consumption of alcohol or drugs, excessive gambling (at slot machines), attempted suicide, depression and low self-esteem, frequent boredom, paranoid projections on others, lack of moral conscience (super ego deficit), and childhood symptoms. It is unlikely that such symptoms could be produced by owning guns or other weapons. Therefore, a higher prevalence of mental disorders among gun owners, may indeed point to a causal relationship (see Table 9).

Table 9: Prevalence (%) of Gun Ownership among Soldiers ShowingIndicators of Psychiatric Symptoms (N=21,274[a])

Indicators of Psychiatric Symptoms	*Nonowners (n=14,298)*	*Gun Owners (n=4,849)*	*Unknown (n=2,167)*
No symptom reported (n=11,935)	59.9	49.6	44.6
Any symptoms, but only before age 16 (n=956)	3.8	5.7	6.5
Any symptoms, but only after age 16 (n=5,651)	27.0	24.0	29.1
Chronic symptoms or dissocial personality disorder (n=2,733)	9.4	20.7	18.1
No information at all on mental health (n=39)	0.0	0.0	1.8
Total	100.0	100.0	100.0

a. Missing 39 responses

Gun owners suffer slightly more than other respondents from psychiatric symptoms during childhood and adolescence, and considerably more from chronic symptoms. Similarly high rates are found among those who did not answer the items on gun ownership. On the other hand, any such problems at the adult age seem to be unrelated to owning a gun. As one might expect, the prevalence of psychiatric symptoms is even higher among those seriously violent gun owners who had injured somebody during the previous 12 months and who had shot at another person (presumably without hurting the victim). Among these 51 seriously violent people, 82% suffer from chronic symptoms or personnality disorder, compared with 21% of all gun owners and 9% of nonowners. Similarily, 35% of these seriously troubled persons have committed at least one suicide attempt during their lifetime, compared to 6% of other gun owners and 3% of nonowners. Three quarters (75%) of these serious cases meet the diagnostic criteria of a dissocial

personality (according to the psychodynamic concept developed by Rauchfleisch, 1981), compared with only 7% of the remaining respondents.

Given these percentages, it appears that mentally disturbed persons are disproportionately represented among gun owners. This is not to say that gun owners in general are disturbed people: As shown in Table 9, 50% of gun owners experience no symptom whatsoever. There may also be disproportionate numbers of persons suffering from some symptoms among the fans of many other sports and leisure activities as well.[2] However, guns may be dangerous precisely because of the fascination with guns by mentally disturbed persons with violent propensities.

Multivariate analyses

So far, only bivariate associations have been considered. There remains to be seen to what extent these several variables remain important in explaining violence once other potentially competing variables are taken into account.

Table 10 shows variables that contributed significantly to explaining self-reported violent injuries inflicted upon others in a first round analysis. Having injured somebody by intentional acts of violence is linked to a number of situational and other explanations of violent behaviour, and not just to gun-related violent acts (see Table 3). Thus we decided to take this variable as the dependant variable in the following analysis modelling the impact of weapons in the light of other relevant variables. With the exception of unemployment, all independent variables turned out to be significant in the bivariate analysis, a fact which is not surprising given the large size of the sample (see Table 11). The variables appear as interval-scaled in the logistic regression analysis, according to the way they were measured by the questionnaire. Hence, the possession of weapons (as well as other variables) has not been dichotomized. Rather, the odds ratios refer to the increase in risk for every additional weapon owned.

[2] We found indeed such a tendency among "techno" fans (dance-floor crowd), but not among football and hockey fans.

Table 10: ***Multivariate Logistic Regression Analysis, Using (Interval-Scaled) Situational and Personality Variables to Explain the Likelihood of Purposefully Inflicting Injury on Another Person (N=20'069)***

Independent Variables that stayed in the Model	Odds Ratio	p <
Life-time frequency of accidents (0-40)	1.022	.0065
Suffered from conduct disorder (DSM-IV) in childhood or adolescence, (0=no, 1=milder form, 2=severe conduct disorder)	1.433	.0001
Having had a good relation with teachers during adolescence (0=not at all good, 1=not very good, 2=quite good, 3=very good)	0.871	.0055
Having been a police suspect during childhood or adolescence (but not indicted and not convicted) (0=no, 1=yes)	1.488	.0002
Having had to appear before a juvenile court during childhood or adolescence (0=no, 1=yes)	1.743	.0001
Number of criteria fullfilled for dissocial personnality disorder (number of symptoms of this disorder) (0-9)	1.157	.0002
Frequency of gambling at slot machines (0=never, 1=1-2x/month, 2=1-2x/week, 3=more than 3x/week)	1.172	.0019
Frequency of watching hard core pornography and splatter videos (0-60)	1.013	.0016
Having a girlfriend (0=no, 1=yes)	1.372	.0013
Number of delinquent friends (0-7)	1.102	.0001
Number of handguns owned (0, 1-2, 3+)	1.527	.0001
Number of baseball bats, nunchakus etc. owned (0, 1-2, 3+)	1.504	.0001
Number of iron bars, chains, knuckle dusters etc. owned (0, 1-2, 3+)	1.400	.0001
Number of rifles owned (0, 1-2, 3+)	0.821	.0049
Frequency of carrying a weapon (0, 1-2, 3-5, 6-20, 20+)	1.024	.0007

Model Fitting Information and Testing Global Null Hypothesis BETA=0
(backward and stepwise procedure yielded the same model)

Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
AIC	5868.182	4714.236	.
SC	5876.089	4840.747	.
-2 LOG L	5866.182	4682.236	1183.946 with 15 DF (p=0.0001)
Score	.	.	2345.752 with 15 DF (p=0.0001)

Goodness-of-fit Statistic = 48.331 with 8 DF (p=0.0001)

Classification Table

		Correct		Incorrect		Percentages				
Prob Event	Prob Level	Event	Non-Event	Event	Non-Event	Correct	Sensi-tivity	Speci-ficity	False POS	False NEG
0.032	0.500	58	19330	70	611	96.7	8.7	99.6	55.7	2.9
0.032	0.250	138	19160	240	531	96.3	20.6	98.8	64.5	2.6

When looking at the predictive value of the model, we see that it is quite capable of predicting nonviolence, but not very sensitive in predicting those men who had actually injured somebody. This is what we would expect, because injuring somebody depends very much on circumstances, not solely on the violent attitude or the behavior itself. When we measured the impact of these same independent variables on violence across the violent acts committed, this was of course different and those models were more sensitive at predicting who had been violent (cf., Haas 2001).

It may also be interesting to take a closer look at those variables which were removed from the model, because of redundancy or lack of significance: (1) possession of knifes, (2) presence in many different groups and events, (3) being unemployed, (4) having moved to a bigger city after adolescence, (5) visiting prostitutes, (6) prostituting one-self, (7) number of friends, (8) being born from immigrant parents, (9) having acquired higher education or professional training, (10) having had good relations with the classmates in highschool (being popular), (11) having had to repeat a year in highschool because of poor educational achievements, (12) having been placed in a special school for pupils with learning or behavior problems, (13) having been placed in an institution for delinquent or neglected children (14) having been

beaten by the parents, (15) having been sexually abused or exploited, (16) excessive drinking, (17) heroin and cocaine abuse.

The number of guns and other weapons owned is the most strongly contributing factor to the risk of causing intentional injury to someone else. Given the many interval-scaled independent variables included in the model, it is not surprising that the odds ratios are small. However, the presence of every additional handgun (up to a maximum of three, as allowed in the questionnaire) increases this risk by more than 60%. Hence, for those who own three or more handguns the odd's ratio is 3.6, and for owners of at least three iron bars, knuckle dusters or chains the odd's ratio is 2.7. For owners of wooden weapons (baseball bats etc.), the ratio is also 3.4. Carrying such weapons again increased the risk to an odds ratio of 1.6 for those who did so more than 20 times a year. We further found a heavy influence of psychopathology: those who qualify for a dissocial personality disorder who fullfill three or more criteria have an odds ratio of over 1.5, those who have had a severe conduct disorder an odds ratio of 2.1 and finally men with a tendency to have many accidents (40 or more) had an odds ratio of 2.3. When other impulsive behaviours are considered, we again note that the odd's ratio is 1.6 for heavy gamblers at slot machines, that watching hard core pornography and (forbidden) gorey movies (of the type "Texas Chain Massacre") 60 times or more yielded an odds ratio of 2.2, and that having seven or more delinquent friends produced an odds ratio of 2.

This analysis offers a sophisticated picture of different bad influences on the risk of injuring somebody. The value of the present model lies in the fact that all - and not just some - of the most important known potential influences were considered. To our knowledge, this has never been done before in criminology. Therefore, we can be quite sure that the remaining factors in the model are not in fact masking underlying influences that have not been considered. Therefore, we conclude that four main causes lead to bodily injury: (a) possesion and carrying of weapons, (b) psychopathology (c) impulsive behaviours and (d) bad company. Seeking bad company and adopting impulsive behavior are known as *acting-out* in psychopathology. There is psychological evidence that people with personnality disorders have a tendency to "act out" when they search for risky, conflict provoking situations.

Since the times of Sutherland (1934) having delinquent friends has belonged to the credo of any criminologist, while gambling has been identified in the Cambridge Study (Farrington 1995).

Thus, the findings reported in Table 10 confirm the roles of many conventional variables in criminological research, and particularly of guns and other weapons. The exceptions seem to be rifles (associated with lower risks), the possession of knives which is not significantly related to the dependant variable. That knives are not significant may be due to the large number of scout knives among Swiss youths, so that any possible effects may be diluted. Possession of rifles may have been admitted by many former scouts and those who had attended training at target shooting before joining the army, thus introducing many particularly conformist youth into this category. The finding that rifles are negatively related to assault with injury in this sample, and simultaneously contribute to suicide and homicide of females in an international perspective (Killias, van Kesteren & Rindlisbacher, 2001), may not necessarily be contradictory. In fact, 20-year old soldiers usually are unmarried and therefore have no opportunity to assault spouses. Hence, assault with injury may involve almost exclusively nondomestic violence, whereas rifles typically tend to be used in domestic violent encounters. We found that men who have a girl friend are more in danger of commiting a violent act than those who do not have a girlfriend.

Another interesting result is the nonsignificant odds ratios of variables such as offering sex for money or being unemployed. This is surprising since much criminological thinking has focused on strain (including anxiety and stress) as being an important factor in violence. We suspect that unemployment may be less threatening to army recruits during the months preceding military training. However, we were surprised to see that male prostitutes are not as aggressive and violent as they often are assumed to be.

It should be noted that the results of the logistic regression analysis were obtained using a model where missing values are replaced by imputing the means of the corresponding variables (for those injured someone and those who did not). Imputing allowed us to avoid a biased sample resulting from the accumulation of missing values on the many independent variables. In this case and using the variables listed in Table 10, the sample would have been reduced to 12,620 rspondents. To reduce risks resulting

from any choice between two methods, we decided to conduct the logistic regression analysis both ways. The results concerncing the role of weapons were similar: the only exception was that the owning of iron bars, knuckle dusters, and iron chains did not reach the level of significance if missing values were systematically excluded. This finding seems plausible if one considers that as shown in Table 1, many respondents failed to answer this item since it concerned types of weapons that cannot legally be owned.

Conclusions

In this study, a substantial number of events have been analysed which are too rare in any given population to be studied using samples of a conventional size. We are unaware of any other study that has identified so many instances of illegal gun use among a general population. Despite the cross-sectional design of the present study, there is some indication that owning weapons may play a causal role in violence, rather than simply reflect a reaction to former violent victimization.

Although the majority of gun-owners are indeed conformist and law-abiding citizens, we that there is a large subgroup that are not. We also found a higher prevalence of psychiatric symptoms in this population. These findings underscore the need to design better policies to control access to and ownership of guns. A relatively small minority of gun owners may be responsible of a disproportionate number of violent incidences. This is the good news of the story, because it gives hope that public safety could be greatly improved by controls targeted at a relatively small number of potentially dangerous gun owners. On a legal level, such a strategy might be rather easy to implement, because a considerable number of these individuals are already known to the adult and/or juvenile criminal justice system.

Another finding that may be relevant for policy making is the important role of weapons other than guns, such as iron bars, knuckle dusters, iron chains etc., or devices such as baseball bats. Policies designed to make such objects hard to obtain, might equally be beneficial for combating violence, especially among juveniles.

In assessing these results, it should be kept in mind that possession of most types of weapons is related to violent acts, either committed or experienced. The fact that rifles are associated with reduced rates of certain kinds of violence simply means that hunting and target shooting may, among juveniles, attract those who follow more traditional, conformist lifestyle models. This is not to say that rifles are not dangerous in other respects, as in connection with suicide, domestic violence, and accidents involving children, for example. On balance, the best policy might be to keep guns and other dangerous devices out of the hands of people, and particularly to exclude from gun ownership individuals with criminal risks or psychiatric problems.

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Key words:

Violence – bodily injury – weapons – gun control – personality disorder – cohort study.